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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,826	09/10/2003	Sudhakar K. Rao	091-0201	5968

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EXAMINER

DINH, TRINH VO

ART UNIT	PAPER NUMBER
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2821

DATE MAILED: 02/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/659,826

Applicant(s)

RAO ET AL.

Examiner

Trinh Vo Dinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 14-21, 23-26, 29-38 and 40-42 is/are rejected.
- 7) ☒ Claim(s) 9-13, 22, 27, 28 and 39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>09/10/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawing

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "solid graphite or gold-molybdenum mesh reflector" in claim 3, "at least one of said plurality of horns is not a circular type of horn in claim 9, a spherical cap" in claim 12, and "a distinct compact 6-port OMT/polarizer" in claim 27, and "ground terminal and multiple satellites" in claims 41-42 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 15-22, 24, and 29-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 15, line 6, and claim 29, line 9, it is unclear what "oversized" means. It is not clear because what size, how big is oversized.

In claim 22, it is unclear what "half-power-width" means. It is not clearly defined in the specification. In addition, what is meant by "to produce said required beam size at a K-band frequency taking reflector shaping into account"?

Claims 16-21, and 30-33 are rejected because they depend on the rejected base claims 15 and 29 respectively.

In claim 24, lines 2-3 recited two frequency bands, which the feed array is defocused. In contrast, only one frequency band (the highest frequency band) which is defocused as claimed in the base claim 23. It is unclear a highest frequency band as recited in claim 23 is EHF and Ka band.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 4-8, 15-21, as the best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Ramanujam et al (USP 6,323,817 B1).

With respect to claim 1, Ramanujam discloses, in Figs. 2-3, a reflector (202) having a modified-paraboloid shape; and a multi-beam, multi-band feed array (200) wherein said feed array is located close to a focal plane of said reflector, said feed array includes at least one horn (214), said feed array forms a plurality of beams (208, 212), each of said plurality of beams being formed by a single horn of said feed array (col. 3, lines 40-55); and said antenna system each of said plurality of beams is congruent, and said plurality of beams is contiguous (BEAMS in Fig. 2, or Fig. 6). Ramanujam further discloses said reflector (202) being the single reflector of said antenna system and said reflector surface is non-frequency selective.

With respect to claims 15 and 6, Ramanujam discloses, in Fig. 2, a reflector (202) having a non-frequency selective reflector surface, wherein said reflector surface has a modified-paraboloid shape, and said reflector is sized to produce a required beam size at a lowest frequency band, and said reflector is oversized at a highest frequency band (col. 1, lines 33-41).

With respect to claims 4-5, and 16-17, Ramanujam discloses, in Fig. 2, the reflector (202) being an offset and axis-symmetric reflector.

With respect to claims 7, and 18-21, Ramanujam further discloses the reflector (202) having a synthesized surface. Note that the recitations "broadens a beam with moderate effect at a highest frequency band and at an intermediate frequency band and with minimal effect at a lowest frequency band", "said reflector has a synthesized surface with a maximum peak-to-

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peak variation from a parabolic surface of 0.1 1 inch”, “said reflector has a synthesized surface of modified-paraboloid shape; and said synthesized surface is moderately shaped and disproportionately broadens higher frequency-band beams compared to lower frequency-band beams, “said synthesized surface forms identically-sized beams of 0.5 degree diameter at K-band, Ka-band, and EHF band”, and “said synthesized surface forms identically-sized beams of 0.5 degree diameter at C-band, X-band, and Ku band are not structural limitations to define over prior art that meet the claimed structural limitations. In order to extinguish from the prior art, functional recitations must be recited with structures for performing the specified functions.

With respect to claim 8, Ramanujam discloses said multi-beam, multi-band feed array (200) comprises a plurality of circular horns (206).

6. Claims 23-25 draw to the apparatus and the method claims 34-38 and 40-42 are rejected under 35 U.S.C. 102(e) as being anticipated by Rao et al (US 2003/0142014 A1).

The applied reference has two common inventions with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

With respect to claim 23, Rao discloses, in Fig. 1 and abstract, an antenna system (10) comprising a plurality of high-efficiency multi-mode circular horns (abstract), wherein said feed array being focused at a lowest frequency band (downlink frequencies band), and said feed array

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is defocused at a highest frequency band (uplink frequencies). Rao further discloses the system having a beam forming network (paragraph [0004]).

With respect to claims 24-25, the recitations “said feed array is defocused by 0.25 inch at EHF-band”, “said feed array is defocused by 0.1 inch at Ka-band, and said feed array is focused at K-band”, “said feed array broadens an EHF beam and a Ka beam from 0.4 degrees to 0.5 degrees, and said feed array forms a 0.5 degree beam at K-band” are not structural limitations to define over prior art that meet the claimed structural limitations. In order to extinguish from the prior art, functional recitations must be recited with structures for performing the specified functions.

With respect to claims 34-38 and 40-42, the apparatus discussed above would perform the claimed method.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujam in view of Neynolds et al (USP 5,885,906).

Ramanujam discloses every features of the claimed invention except the reflector being gold-molybdenum mesh. Neynolds discloses a reflector being made gold-molybdenum mesh (col. 3, lines 44-48, or col. 5, lines 65). The use of metallic mesh material is well known in the art for constructing antenna reflector. Therefore, making Ramanujam's reflector using gold-

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molybdenum mesh would have been obvious to one skill in the art (Neynolds: col. 5, lines 54-55).

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujam in view of Toland (USP 6,504,514 B1).

Ramanujam discloses every features of the claimed invention except a beam forming network. Toland discloses, in abstract, an antenna system having a beam forming network. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ Toland's beam forming network to Ramanujam's system in order to perform and process antenna system 's beams.

10. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rao in view of Judasz (US 2002/0190911 A1).

Rao discloses every feature of the claimed invention except a specific structure of the horn. Judasz discloses a horn (11 in Figs. 1-2) has an aperture diameter and a waveguide diameter, said horn has a first step, between said aperture diameter and said waveguide diameter, at which the diameter of the circular cross-section of said horn abruptly changes, said horn has a second step, between said first step and said waveguide diameter, at which the diameter of the circular cross-section of said horn abruptly changes. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Rao's antenna system with the feed horn as taught by Judasz in order to minimize the length of horn antenna at the desired operational bandwidth and provide low sidelobes and low cross polarization, over a relatively wide bandwidth, with high electrical efficiency.

Allowable Subject Matter

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11. Claims 9-13, 27-28 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and/or rewritten to overcome the drawing objections set forth in the office action.

12. Claim 22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

13. Claims 29-33 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

14. The following is a statement of reasons for the indication of allowable subject matter:

The cited art of record fails to teach multi-beam, multi-band feed array comprising a plurality of horns wherein at least one of said plurality of horns is a circular horn and at least one of said plurality of horns is not a circular type of horn as defined in claim 9, or recitations defined in claim 10, or said feed horns are placed on a spherical cap with a radius of a distance from an aperture center of said reflector to said focal point, said radius of said spherical cap centered at the aperture center as defined in claim 12, or a compact 6-pod OMT/polarizer wherein said feed array provides dual-circular polarization capability at each of three distinct frequency bands as defined in claims 13 and 27-28 and 39, said reflector is sized to have an aperture D according to $D = 70 \times (\text{wavelength (at 20.2 GHz)}) / (\text{half-power beam-width})$ to produce said required beam size at a K-band frequency taking reflector shaping into account as defined in claim 22.

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Inquiry

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trinh Vo Dinh whose telephone number is (571) 272-1821. The examiner can normally be reached on Monday to Friday from 9:30AM to 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong, can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'Trinh Vo Dinh', with a long horizontal flourish extending to the right.

Trinh Vo Dinh
February 07, 2005